

Report on a Training Seminar on the IALA Risk Management Toolbox

Singapore

5 - 9 October 2015



Jean-Charles Leclair
Dean of the IALA World-Wide Academy

This report includes details of the programme, a list of participants and final recommendations arising from the annual 5 day training seminar on the IALA Risk Management Toolbox held in Singapore in October 2015

Report on a Training Seminar on the IALA Risk Management Toolbox

CONTENTS

	Page
1. Background and objective	3
2. Preparation of the seminar	3
3. Progress of the seminar	3
4. Conclusions and Recommendations	10

Annex A – Programme

Annex B - List of Participants

Report on a Training Seminar on the IALA Risk Management Toolbox

1. Background and Objective

The fourth annual IALA Risk Management Toolbox Seminar delivered by the IALA World-Wide Academy was held in Singapore from 5 till 9 October. It was delivered in conjunction with Maritime and Port Authority of Singapore Academy (MPA Academy) and was attended by 28 participants from 10 countries. In addition to the host nation, these were : China, Korea, Vietnam, Ecuador, Norway, Bahrein, South Africa, Japan and Taiwan. A full list of participants is at Annex B.

The seminar aimed firstly to familiarise participants with the PAWSA and Simulation components of the IALA Risk Management Toolbox before providing competency in the use of an IWRAP Mk2 model; a satisfactory understanding of simulation techniques and PAWSA and how the components of the toolbox complement each other.

2. Preparation of the seminar

The superb organization provided by staff from MPA Academy ensured that this seminar was conducted faultlessly. The Dean of the IALA World-Wide Academy is very thankful to the organisation for the efforts to make the seminar the success that it was.

3. Progress of the Seminar

Day 1 – Monday 5 October 2015

The seminar was opened formally at 0900 by Capt Khong Shen Ping, the Dean of MPA Academy.

The opening ceremony closed at 1100 with a group photograph.



Organizers, Presenters and Participants at the Opening Ceremony

Session 1: Introduction to IALA and the IALA World-Wide Academy (IALA WWA) Obligations under SOLAS Ch V 12; 13 (Dean IALA WWA Jean-Charles Leclair)

The session was opened by Rear Admiral, Jean-Charles Leclair, Dean of the IALA World Wide Academy who explained the purpose of the seminar before introducing the programme. He then introduced himself and his fellow lecturers (Mr Omar Frits Eriksson; Captain Tuncay Cehreli;

Report on a Training Seminar on the IALA Risk Management Toolbox

Professor Knud Benedict; Mr Roger Barker and Mr Per Christian Engberg) and invited participants to introduce themselves.

The Dean delivered his first presentation on IALA which covered its aim and purposes, and its important motto : “successful voyages, sustainable planet”. The Dean explained the advantages of the planned move to an Intergovernmental Organization Status. He explained the work of IALA via the Technical Committees and its publications which is the backbone of IALA. He looked closer to the definition of Aids to Navigation. He then briefed on the function and work of the Academy, and its training activity. He expected that, in the future, IALA through the VTS Committee will work with IMO to make VTS training a mandatory requirement. Jean-Charles Leclair then moved to the Academy’s capacity building activities and showed a map and table of the target regions of the Academy.



The next presentation, again delivered by Jean-Charles Leclair was on the obligations of Coastal States under the United Nations Convention on the Law of the Sea (UNCLOS); the Safety of Life at Sea (SOLAS) and other IMO Conventions. He highlighted SOLAS Chapter V Regulation 13 on the establishment and operation of Aids to Navigation (AtoN) before drawing attention to IMO SN.1/Circ 296 which endorsed the IALA Risk Management Toolbox. He stated that SOLAS Chapter 5 Regulation 12 covered the provision of Vessel Traffic Services and that IMO Resolution A.857 covered VTS activity and training. The Dean covered other important regulations in SOLAS Chapter V before moving on to the requirement for national legislation which could, if appropriate, include rules on the use of IALA risk management tools.

Session 2: Introduction to the IALA Risk Management Toolbox (Omar Frits Eriksson)

Mr. Omar Frits Eriksson then introduced the three components in the IALA Risk Management Toolbox (the quantitative tool IWRAP Mk 2; the qualitative tool PAWSA and simulation) before explaining the historical and theoretical background to each. He explained the definition of Risk with some general examples. He highlighted that IWRAP Mk2 focused only on the probabilities of groundings and collisions, not the consequences. Unlike IWRAP Mk2, PAWSA considers both probability and consequence, using a methodical analytical approach to the management of risk. Simulation in risk management is a combination of traditional ship simulators and numerical navigators. He concluded that IALA was investigating a simplified risk management qualitative tool (SQUART) that is not finished yet, and the incorporation of other tools such as SAMSON being developed by the Netherlands.

Report on a Training Seminar on the IALA Risk Management Toolbox

Session 3: Overview of MPA and MPA Academy (Capt. Khong Shen Ping, the Dean of MPA Academy)

Capt. Khong Shen Ping, the Dean of MPA Academy, gave a very comprehensive presentation as introduction to Maritime and Port Authority of Singapore (MPA) and the MPA Academy. He started with MPA's Role & Mission Objectives. He showed impressions on how the future terminals will look like.

After mission objective 1, he explained mission objective 2, Singapore as an International Maritime Centre. The tool for this is MPA's manpower development plan. It is clear that MPA invests a lot in training and has a good campaign to encourage young people to choose for a maritime career.

Mission objective 3, Safeguard & Advance Singapore's Maritime Interests shows MPA's role as National Maritime Representative.

The next subject was MPA's Academy and as the Dean of the Academy he was pleased to share in detail its mission.

- To conduct training for MPA officers to enhance their specialist skills and knowledge
- To conduct training under MPA's multilateral and bilateral technical assistance programmes
- To share knowledge and experience for the benefit and interest of the international maritime community with our partners

A nice and professional movie about MPA was then shown. The professionalism and effectiveness of MPA was also reflected during the seminar. All preparations and the whole event went very smooth thanks to a great job done by MPA's Academy staff.



Session 4a: Regional Case Study of the use of IALA Risk Management Tools (Roger Barker); Use of Simulation in Risk Management (Knud Benedict)

The Chair, Frits Omar Eriksson, introduced Captain Roger Barker who delivered a presentation on case studies in the English Channel and North Sea between the United Kingdom and Continental Europe. The topics of his presentation covered PAWSA as a qualitative ports and waterways safety assessment tool, IWRAP as a quantitative tool and simulation. He drew the attention to the related IALA publication on Risk management being : IALA recommendation 0-134 on the IALA Risk Management Tool for Ports and Restricted Waterways, IALA Guideline 1018 on Risk Management and the IALA World Wide Academy Model Course for AtoN: Level 1 AtoN manager training, Use of the IALA Risk management tools. He also informed participants about the Level 1 AtoN managers course as it gives comprehensive information of all aspects on AtoN issues. He showed how AIS plots, contour delimitations, AtoN overlays and IWRAP Mk2 can be used to present risk mitigation measures such as routeing measures to governmental authorities when considering the geographical locations of offshore windfarms. He concluded by reminding participants of other considerations such as AIS carriage requirement by non-SOLAS vessels, different risks/causation

Report on a Training Seminar on the IALA Risk Management Toolbox

factors applied for different classes of vessels and the value of local “qualitative” knowledge. This regional case study was very useful to understand the important relation between the different risk assessment tools.

Professor Knut Benedict continued this session with a presentation on the Use of Simulation in Risk Management: Definitions & Samples. He started with some information about his former work field and explained some details about the Maritime Simulation Centre Warnemünde and its projects. The definition on simulation was explained and Mr. Benedict listed the IALA publications about simulation as these definitions are in that publications. After that the different types of simulation were explained and detailed information about the simulation modelling process was provided. He ended by providing an overview of how simulation was used as a key component of the IALA risk management toolbox and its interaction with IWRAP Mk2 and PAWSA.



A remark of Norway was placed as they experienced that the human factor, as cause of accidents, increased after 1999 from 30 to 70 percent due to for example the implementation of ECDIS.

Session 4b: IWRAP Mk2 Development and Principles Practical Applications of IWRAP Mk2 (Omar Frits Eriksson)

Mr Omar Frits Eriksson provided greater detail of the development and principles of IWRAP Mk2. He explained that it was based on defined traffic “legs” each of which used a probability (Gaussian) curve to determine the lateral traffic distribution on each leg. A traffic separation scheme would show clear offsets between sets of distribution curves for traffic steaming in each lane. Traffic density plots are developed for small (e.g. 100m x 100m) squares using historical AIS data with higher densities shown in red, and few ships in lighter colours. The purpose is to predict the annual number of collisions and groundings on each leg. Human “causation” factors (Pc) are used to weight the calculation of accident frequencies. He proceeded by explaining the rationale behind the analysis of powered and drifting groundings and categories of collisions. It was recognised during this presentation that VTS significantly can influence this in a positive way.

Day 2 – Tuesday 6 October 2015

Session 5a: PAWSA Development and Principles (Tuncay Cehreli)

Captain Tuncay Çehreli started with the programme of the day. He provided an overview of the qualitative risk assessment tool PAWSA and its risk factors before moving on to its administrative implementation and planning procedures. Basically the outcomes of the report should cover additional mitigation of an identified risk as it evaluates existing risk mitigation measures. PAWSA originally used 5 MS Excel® workbooks to generate risk mitigation measures. After implementing PAWSA in Izmit bay with 5 books, Turkey decided to reduce to 4 The book on risk factor rating scales was not used due to its minor effect that could be ignored. He advised that PAWSA was a two-day workshop together with all the participants which considered 24 factors in its risk model (6 risk categories; 4 definitions per category). The waterways risk model may be tailored keeping in mind the

main focus and it is not possible to delete 1 box, only the content of the box as it is an Excel spreadsheet. This was a question during the training. The ideal proportion of participants is a split of 60/40 users/stakeholders and divided into teams with 2 or 3 in each.



He showed a local example in Izmit bay PAWSA chart study where they asked the participants to identify and mark the risk areas. Then this was combined with quantified results of PAWSA. Based on experience gained Mr. Cehreli informs that the outcomes depend a lot on the motivation and continuity of the participants and it is strongly recommended to use the PAWSA implementation guide. It covers 7 modules for example the preparation and conduct of the PAWSA workshop. It is important to provide statistic information as input to the workshop. This can be about traffic volumes, cargoes and beside that hydro/meteo and waterway information should be available during the workshop.

Session 5b: PAWSA Use of workbooks (Tuncay Cehreli)

Before starting the next session Captain Tuncay Çehreli reflected on his first presentation by giving the advice to only approach an organisation for participants instead of individuals. It should be the decision of the organisation who to send to a PAWSA workshop and not the choice of the facilitator. After this he gave a very clear presentation on the function and use of the 5 PAWSA workbooks used in the Izmit bay . He explained the inputs into the Waterways Risk model, the 6 x 4 risk matrix model, and the considerations to be taken during the input process, including the immediate and subsequent consequences of maritime accidents. The content of each box was explained and Mr. Cehreli ones again emphasised you may tailor the factors as appropriate based on the needs of you area.

Mr. Cehreli then explained that under the guidance of a facilitator (moderator) supported by dedicated note-takers, PAWSA teams input scores (1 – 4) into the relevant workbook input sheets. Once processed by the PAWSA software, these resulted in scores of 1.0 – 9.0 on the baseline risk matrix. Book 2 then assessed the relative competency of each team in each of the 6 risk categories resulting in an output of team expertise distribution. The combination of Book 1 and 2 outputs were used to determine the effectiveness of risk mitigation measures which teams agree are balanced or

Report on a Training Seminar on the IALA Risk Management Toolbox

whether additional measures are required. The Book 3 output displays the list of balanced / unbalanced mitigation measures and which require further investigation. Book 4 processes additional interventions and determines the results of such measures before displaying specific measures and cautions. He ended this session with showing the difference between the original PAWSA workbooks and the versions developed and used during the regional case.

A question was raised whether as a facilitator you should have certain requirements for the participants. Mr. Cehreli advised not to state specific requirements but inform the organisations about PAWSA and your expectations regarding the participants in your invitation. During the questions it was also discussed that there is no minimum threshold only all the results should be mentioned in the report.

Session 5c: Test Case – Izmit Bay, PAWSA Test Case - continued (Tuncay Cehreli)

Mr. Cehreli started this presentation by saying he could imagine that the former presentation about the use of the workbooks can be confusing. To make this more clear the test case of Izmit Bay was shown to make all clear. He showed the exact programme that was conducted during this PAWSA session. He outlined the maritime environment and traffic mix in the area before providing statistical details including marine accident figures. He explained that the 24 risk factors were some of tailored to apply to specific characteristics of Izmit Bay. Having completed the outline briefing, Mr. Cehreli invited participants to complete sections of PAWSA Book 1. Questions were raised what to do as participant if you face questions that you are not expert in. The participants should answer them all as the knowledge, thoughts and perception of all participants is important. The results can be compared with statistics.

Session5d: PAWSA Test Case - continued (Tuncay Cehreli)

After lunch Mr. Cehreli started with workbook 2 Risk Factor Rating Scales and continued with workbook 3 on team expertise. This team expertise input to the PAWSA system affects the outcomes as it is a weight factor that is applied. He continued with book 4 on Mitigation Effectiveness and finished with book 5 on additional mitigation measures and their effectiveness.

He ended with a summary stating that the combination of Book 1, 2, 3 and 4 outputs were used to determine the effectiveness of existing risk mitigation measures which teams agree are balanced or whether additional measures are required. The Book 4 output displays the list of balanced and unbalanced existing mitigation measures and which require further investigation. Book 5 processes additional interventions and determines the results of such measures before displaying specific measures and cautions.

Mr. Cehreli ended the whole PAWSA session by sharing the implemented solutions at Izmit bay. One of the most important additional measures proposed by the PAWSA workshop participants was the implementation of a VTS system.

Day 3 – Wednesday 7 October 2015

Session 6: Maritime Simulation Overview of Maritime Simulators, Simulation Techniques in risk management (Knud Benedict)

Pr. Knud Benedict started this second session on maritime simulators with an overview of all different simulator types and new developments, from VTS and bridge simulation to decision

Report on a Training Seminar on the IALA Risk Management Toolbox

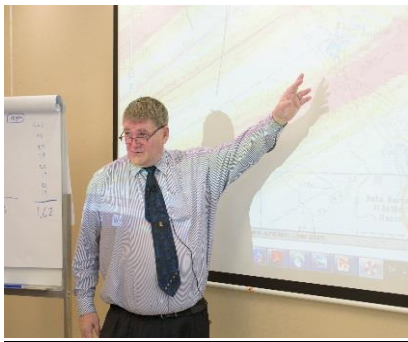
support simulators. He also took a closer look at all the pro's and con's about advanced simulations systems.

The final section of Professor Benedict's presentation dealt with samples of the application of maritime simulation based on a description of objective and tasks including human factors in risk-based ship design methodology. This was expanded to highlight specific factors to be considered in accurate simulation. He ended by providing an overview of how simulation was used as a key component of the IALA risk management toolbox and its interaction with IWRAP Mk2 and PAWSA.

Session 7: Creation of an IWRAP Mk 2 model using Singapore MSA AIS data

Mr Omar Frits Eriksson, assisted by Mr Per Christian Engberg, guided participants through the process of creating an IWRAP Mk2 model based on the Singapore traffic approaches. AIS data and chart data were then uploaded before traffic route "legs" and topographic areas were defined.

Session 8a: Advanced IWRAP Mk2 modelling (1)



After the lunch break participants practiced generating the necessary polygons of land masses and depth contours required for grounding predictions. Models were then run to calculate the number of annual groundings and collisions (or years between such incidents). Individual results were then compared and reasons for differences were discussed.

Session 8b: Advanced IWRAP Mk2 modelling (2)

Capt. Roger Barker gave a presentation building on the examples he used in session 4a. He explained in detail how the traffic on a leg, generated from the density plot, can be used to demonstrate the change in quantified risk when plans for change are assessed. He showed how the initial traffic distribution curve automatically created by the IWRAP tool can be amended to represent the situation after a change. He explained how useful this quantified data can be when presenting cases or issues to other stakeholders.



Report on a Training Seminar on the IALA Risk Management Toolbox

Day 4 – Thursday 8 October 2015

Session 8c: Final IWRAP Mk2 modelling

After a very joyful dinner the day before everybody was ready to get started. The Secretary-General of IALA, Mr. Francis Zachariae, opened the session by informing that he joined the Straits e-navigation Alliance (SENA) during the beginning of the week.



He noticed that during this meeting the most used words were risk assessment, so he concluded that this seminar must be very important for the participants who work in the field of AtoN. More over because a risk assessment is the way to meet the international obligations under SOLAS Chapter 5 regulation 12 and 13 which say that an organisations should know the risks in their area.



Mr Eriksson, assisted by Mr. Per Christian Engberg, continued the IWRAP Mk2 practical session by answering all the questions of the participants.

Session 9: Complementary use of IALA Risk Management Tools-Regional Case Study-Izmit Bay (Tuncay Cehreli, Omar Frits Eriksson, Knud Benedict)

In session 9 on Complementary use of IALA Risk Management Tools, Izmit bay PAWSA and IWRAP implementations are used as a case study. First, Mr. Cehreli briefly introduced and interpreted the chart study of PAWSA which shows 5 relatively high risky areas in Izmit bay and provided information with their approach to these areas by using IWRAP and Simulation techniques to take the most appropriate risk mitigation measures. He also introduced the Izmit bay IWRAP study which has been done by Istanbul Technical University Maritime Faculty to emphasize the importance and benefit of complementary use of the IALA toolbox. Then Mr. Eriksson focused on mutual positive effects of the tools when used sequentially or in parallel. He also emphasized the effect and importance of causation factor for IWRAP and in the complementary use of the tools. Mr. Benedict underlined the benefits of use of simulation particularly on identifying the risks and evaluation of the effectiveness of the new / planned mitigation measures. An example was given on a situation in Izmit bay. In different IWRAP scenario's it was tested what was the best way for ships to approach a bridge that was in a bend. The results showed that it was the best when ships did not had to alter course near to the bridge but the ship was in a straight line to that bridge before making its approach.

Session 10: IWRAP Case Study Malacca Strait – comparison between models (Omar Frits Eriksson)

Mr. Eriksson started with sharing the geographical details of the area and an overview of the model. He explained how to copy data of legs and the volume of the traffic. By copying a leg, automatically a master leg is created. When later on the volume of traffic in that leg is changed, only the master

Report on a Training Seminar on the IALA Risk Management Toolbox

needs to be amended. Some results were discussed and an example was shown on how, by a mistake, you can have a wrong output in IWRAP. The system had calculated the risk only based on a wreck and not the buoys that marked the wreck. After changing the causation factors the new results were compared with historical data and the output was better.

Session 11: Presentation on VTIS and visit to Port Operations Centre



Day 5 – Friday 9 October 2015

Session 12: Discussion on the IALA Risk Management Toolbox, Summary of the interaction between IALA's Risk Management Tools, Review of Current and Future Risk Management (All)

Mr. Eriksson started this session by triggering his audience with some questions. He used the example of the isolated danger mark “Batu Berhanti” positioned in the deep draft lane of the traffic separation scheme of Singapore Strait. This mark is often not in position and it was discussed what would be the effect of this on the traffic flow. Would the distribution close in to the danger or would the opposite happen. Also the option of a virtual AtoN was discussed.

A movie was shown about future possibilities on the use of IWRAP. It was impressive for the participants to see a movie of traffic based on IWRAP that also showed the ship domain presented as an ellipse. That brought some participants to asking how long the IWRAP version that was installed on their laptop will be available. Mr. Engberg explained in detail how the participants could use the programme for a certain period.

Mr Omar Frits Eriksson reminded participants of the availability of the IWRAP Wiki and the IALA Dictionary via the “Technical” tab on the IALA website (www.iala-aism.org). He moved on to remind participants on IALA-NET and introduced the IALA group on the LinkedIn social media website for information exchange. He briefed that an IALA sub-group had been created for IALA Academy Alumni.

Report on a Training Seminar on the IALA Risk Management Toolbox

Summary and Closing Ceremony

The Dean then thanked the organisers, presenters and administrators and their parent organisations individually for the most professional conduct of the workshop.

Certificates were then presented before The Dean wished all delegates safe journeys home.

Report on a Training Seminar on the IALA Risk Management Toolbox

Annex A

IALA World-Wide Academy Risk Management Training Seminar
Singapore

5 till 9 October 2015

In conjunction with MPA Academy of the Maritime and Port Authority of Singapore.

PROGRAMME



Day 1 – Monday 5 October 2015			
Time	Event	Content	Chair/Presenter
09:30 – 11:00	Session 1	<u>Opening and Review</u> Opening Ceremony Introduction to IALA and the IALA World-Wide Academy (IALA WWA) Obligations under SOLAS Ch V 12; 13	Dean MPA Academy Dean IALA WWA Jean-Charles Leclair
11:00 – 11:30	Break	Group photograph & Coffee break	All participants
11:30 – 12:00	Session 2	Overview of MPA and MPA Academy	Singapore MPA
12:00 – 13:00	Session 3	<u>Introduction to the IALA Risk Management Toolbox</u> Introduction to navigation risk IALA Risk Management Toolbox Overview	Omar Frits Eriksson
13:00 – 14:00	Lunch		
14:00 – 15:00	Session 4a	Regional Case Study of the use of IALA Risk Management Tools Use of Simulation in Risk Management	Roger Barker Knud Benedict
15:00 – 15:15	Coffee break		
15:15 – 16:30	Session 4b	IWRAP Mk2 Development and Principles Practical Applications of IWRAP Mk2	Omar Frits Eriksson
18:30 – 21:00	Reception		
Day 2 – Tuesday 5 October 2015			
09:00 – 10:30	Session 5a	PAWSA Development and Principles	Tuncay Cehreli
10:30 – 11:00	Coffee break		
11:00 – 12:30	Session 5b	PAWSA - Use of workbooks	Tuncay Cehreli
12:30 – 14:00	Lunch		
14:00 – 15:30	Session 5c	Test Case – Izmit Bay PAWSA Test Case - continued	Tuncay Cehreli
15:30 – 16:00	Coffee break		
16:00 – 17:30	Session 5d	PAWSA Test Case - continued	Tuncay Cehreli

Report on a Training Seminar on the IALA Risk Management Toolbox

Free evening			
Day 3 – Wednesday 7 October 2015			
09:00 – 10:30	Session 6	<u>Maritime Simulation</u> Overview of Maritime Simulators Simulation Techniques in risk management	Knud Benedict
10:30 – 11:00	Coffee Break		
11:00 - 12:30	Session 7	Creation of an IWRAP Mk 2 model using Singapore MSA AIS data	
Time	Event	Content	Chair/Presenter
12:30 – 14:00	Lunch		
14:00 – 15:30	Session 8a	Advanced IWRAP Mk2 modelling	
15:30 – 16:00	Coffee Break		
16:00 – 17:30	Session 8b	Advanced IWRAP Mk2 modelling (2)	
19:15 – 23:30	Dinner		
Day 4 – Thursday 8 October 2015			
09:00 – 10:30	Session 8c	Final IWRAP Mk2 modelling	Erik Sonne Ravn
10:30 – 11:00	Coffee Break		
11:00 – 12:30	Session 9	Complementary use of IALA Risk Management Tools-Regional Case Study- Izmit Bay	Tuncay Cehreli Omar Frits Eriksson Knud Benedict
12:30 – 14: 00	Lunch		
14:00 – 15:30	Session 10	IWRAP Case Study Malacca Strait – comparison between models	Omar Frits Eriksson
15:30 – 16:00	Coffee Break		
16:00 – 17:30	Session 11	Presentation on VTIS and visit to Port Operations Centre	Singapore MPA
Free evening			
Day 5 – Friday 9 October			
09:00 – 10:30	Session 12	<u>Discussion on the IALA Risk Management Toolbox</u> Summary of the interaction between IALA’s Risk Management Tools Review of Current and Future Risk Management	Jean-Charles Leclair Omar Frits Eriksson Tuncay Cehreli Roger Barker Knud Benedict Omar Frits Eriksson
10:30 – 11:00	Coffee Break		
11:00 – 12:30	Session 13	<u>Recommendations and Closing</u> Seminar recommendations and feedback Closing remarks and issue of Certificates	Jean-Charles Leclair
12:30 – 14:00	Lunch	Participants disperse on completion	

IALA World-Wide Academy Risk Management Training Seminar
 Singapore
 5 till 9 October 2015
 In conjunction with Maritime and Port Authority of Singapore



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Report on a Training Seminar on the IALA Risk Management Toolbox

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Report on a Training Seminar on the IALA Risk Management Toolbox

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